

1    **What is claimed is:**

2    1. **A viable GGTaI null swine.**

1    2. **A swine according to claim 1 wherein the swine is a miniature swine.**

1    3. **A method of selecting GGTaI null cells comprising the steps of:**

2        (a) **obtaining a line of cells obtained from a GGTaI heterozygous pig or**  
3        **fetus;**

4        (b) **enriching the cells for GGTaI null cells; and**

5        (c) **scanning the line for viable GGTaI null cells.**

1    4. **The method of claim 3 wherein in step (b), the cells are enriched by at least one**  
2        **treatment selected from the group consisting of:**

3        (a) **treating the said cells with anti-galactose- $\alpha$ (1,3)-galactose antibodies, in**  
4        **the presence of complement;**

5        (b) **depleting the said cells with magnetic micro-beads bound with anti-gal**  
6        **reagents;**

7        (c) **treating the said cells with anti-galactose- $\alpha$ (1,3)-galactose antibodies and**  
8        **depleting the said cells with magnetic micro-beads bound with anti-**  
9        **antibodies; and**

10      (d) **treating the said line with gal epitope ligands and depleting the said line**  
11      **with magnetic micro-beads bound with anti ligand antibodies.**

1    5. **The method of claim 3 wherein in step (b), the cells are enriched by multiple**  
2        **treatments selected from the group consisting of:**

3           (a) treating the said cells with anti-galactose- $\alpha$ (1,3)-galactose antibodies, in  
4           the presence of complement;

5           (b) depleting the said cells with magnetic micro-beads bound with anti-gal  
6           reagents;

7           (c) treating the said cells with anti-galactose- $\alpha$ (1,3)-galactose antibodies and  
8           depleting the said cells with magnetic micro-beads bound with anti-  
9           antibodies; and

10          (d) treating the said cells with gal epitope ligands and depleting the said line  
11          with magnetic micro-beads bound with anti ligand antibodies.

1       6. The method of claim 3 wherein in step (b), the cells are enriched by three  
2       treatments of each of the following:

3           (a) treating the said cells with anti-galactose- $\alpha$ (1,3)-galactose antibodies, in  
4           the presence of complement;

5           (b) treating the said cells with gal epitope ligands and depleting the said line  
6           with magnetic micro-beads bound with anti ligand antibodies.

1       7. The method according to any of claims 3-6 wherein the line of cells is a line of  
2       porcine fetal fibroblast cells.

1       8. The method according to any of claims 3-6 wherein the line of cells is a clonal  
2       population of porcine fetal fibroblast cells.

1       9. The method of claim 7 or 8 wherein the porcine fetal fibroblast cells originate  
2       from miniature swine.

1       10. The method according to claim any of claims 3-6 wherein the line of cells is a  
2       line of stem cells.

- 1    11. The method of claim 10 wherein the stem cells are primordial stem cells.
- 1    12. The method according to any of claims 4-6 wherein the anti-galactose- $\alpha(1,3)$ -galactose antibodies are primate antibodies.
- 1    13. The method according to any of claims 4-6 wherein the anti-galactose- $\alpha(1,3)$ -galactose antibodies are monoclonal antibodies or fragments thereof.
- 1    14. The method according to any of claims 4-5, wherein the anti-gal reagents are selected from a group consisting of anti-galactose- $\alpha(1,3)$ -galactose antibodies and lectin.
- 1    15. The method according to any of 4-6, wherein the gal epitope ligands are IB4 conjugates and the anti-epitope ligands are anti-IB4 conjugates.
- 1    16. The method according to claim 15 wherein the IB4 conjugates are selected from a group consisting of IB4 biotin and IB4-FITC and the anti-IB4 conjugates are selected from a group consisting of anti-biotin and anti-FITC.
- 1    17. A porcine GGTa1 null cell.
- 1    18. The porcine cell according to claim 17 wherein the said cell is homozygous for the GGTa1 gene, and wherein the said GGTa1 gene is disrupted or rendered non-functional.
- 1    19. The porcine cell according to claim 17 wherein the said cell is hemizygous for the GGTa1 gene, and wherein the only single GGTa1 allele is disrupted or rendered non-functional.
- 1    20. The porcine cell according to claim 17 wherein the said cell is compound heterozygous for the GGTa1 gene, and wherein the said GGTa1 gene comprises two different mutant alleles.
- 1    21. The porcine cell according to claim 17 wherein the said cell is from Q2.

- 1    22. The porcine cell according to claim 17 wherein the said cell is from Q9.
- 1    23. The porcine cell according to claim 17 wherein the said cell is from Q32.
- 1    24. The porcine cell according to claim 17 wherein the said cell is from Q37.
- 1    25. A porcine organ lacking expression of galactose- $\alpha$ (1,3)-galactose epitopes.
- 1    26. A porcine organ according to claim 26 wherein the said organ comprises cells  
2       homozygous for the GGTAI gene, and wherein the said GGTAI gene is  
3       disrupted or rendered non-functional.
- 1    27. A porcine organ according to claim 26 wherein the said organ comprises cells  
2       hemizygous for the GGTAI gene, and wherein the only single GGTAI allele is  
3       disrupted or rendered non-functional.
- 1    28. A porcine organ according to claim 26 wherein the said organ comprises cells  
2       which are compound heterozygote for the GGTAI gene, and wherein the said  
3       GGTAI gene comprises two different mutant alleles.
- 1    29. The porcine organ according to any of claims 25-28 wherein the porcine organ  
2       is selected from a group comprising heart, liver, kidney, pancreas, thyroid and  
3       skin.
- 1    30. Porcine tissues lacking expression of galactose- $\alpha$ 1,3-galactose epitopes.
- 1    31. Porcine tissues according to claim 30 wherein said tissues comprise cells  
2       homozygous for the GGTAI gene, and wherein the said GGTAI gene is  
3       disrupted or rendered non-functional.
- 1    32. Porcine tissues according to claim 30 wherein said tissues comprise cells  
2       hemizygous for the GGTAI gene, and wherein the only single GGTAI allele is  
3       disrupted or rendered non-functional.

- 1    33. Porcine tissues according to claim 30 wherein said tissues comprise cells which  
2        are compound heterozygote for the GGTa1 gene, and wherein the said GGTa1  
3        gene comprises two different mutant alleles.
- 1    34. A method of creating a viable GGTa1 null swine comprising selecting GGTa1  
2        null cells, enucleating an oocyte, fusing the oocyte with the said GGTa1 null  
3        cell to yield an NT-derived embryo, and implanting the NT-derived embryo into  
4        a surrogate mother, wherein the surrogate mother has initiated estrus, but has not  
5        yet completed ovulation.
- 1    35. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from a line of porcine fetal fibroblast cells.
- 1    36. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from a clonal population of porcine fetal fibroblast cells.
- 1    37. The method of claim 35 or 36 wherein the porcine fetal fibroblast cells originate  
2        from miniature swine.
- 1    38. The method of claim 35 or 36 wherein the porcine fetal fibroblasts cells are  
2        heterozygous for a GGTa1 knockout.
- 1    39. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from Q2.
- 1    40. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from Q9.
- 1    41. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from Q32.
- 1    42. The method according to claim 34 wherein the GGTa1 null cells are derived  
2        from Q37.